Remarks:

Regarding the rejection of claims 1-8, 12-13, 15-17, and 20-21, under 35 USC 103(a) in view of XP-002249876 to Schieberle et al. and WO 03/041515 to Berchtold et al. (hereinafter simply "Schieberle" and "Berchtold", respectively):
The applicant traverses the rejection of the indicated claims in view of the cited prior art.

Throughout the prior communications with the applicant, the Examiner appears to assert that 2-FFT is a chemical already present which automatically "develops" by heating. However, none of the references discloses that heating seeds containing 2-FFT will develop or form 2-FFT, or that the resulting seeds high in 2-FFT have a flavor enhancing effect. In fact, brassica seeds (and sesame seeds) not heated to the correct temperature do not contain or develop 2-FFT except in commercially irrelevant low amounts (less than 1 microgram per kilogram of seeds). There is no automatic "development" of preexisting 2-FFT, instead it *may (or may not)* be formed by various complicated reactions within a biological system containing various enzymes that potentially catalyze the reaction to 2-FFT in a suitable micro-environment, or alternatively, catalyze other reactions instead.

There are various possibilities other than 2-FFT formation - no sulfur compounds could be formed, or sulfur compounds other than 2-FFT could be formed, as, for example, in Vasundhara, where Brassica seeds are heated but apparently are not heated at high enough temperatures. The development/formation of commercially significant concentrations of 2-FFT, contrary to the examiner's statements, is not a certainty or even a real probability based on findings of small amounts of 2-FFT.

Notably, as disclosed by Schieberle, in sesame, unlike in other botanicals, 2-FFT seems to be formed from a water-insoluble *precursor* that apparently is *unique to sesame* and appears to require higher roasting temperatures and longer roasting times to allow 2-FFT formation (Schieberle, last paragraph). This makes it highly unlikely that the skilled person would apply the sesame-specific data to other botanicals.

2-Furfurylthiol has also been detected as a key flavour compound in roasted coffee (Holscher *et al.*, 1990; Blank *et al.*, 1992) and popcorn (Schieberle, 1990). The compound has been identified in the volatile fractions of Maillard model mixtures containing cysteine and pentoses (cf. review by Tressl *et al.*, 1989) and, therefore, its formation in foods is also assumed to proceed from these precursors. However, recent results suggested (Schieberle, 1993) that in sesame the 2-furfurylthiol is formed from a water-insoluble precursor, with higher roasting temperatures and longer roasting times favour the generation of the flavour compound in sesame (Schieberle, 1994).

Similarly, the disclosure of *other* sulfur compounds, e.g. by Vasundhara for Brassica juncea seeds, does not make it more likely that specifically 2-FFT is formed. Instead, from the disclosure of various sulfur compounds but not 2-FFT, the skilled person would conclude that since the author and scientist searched for sulfur compounds but did not find 2-FFT even after prolonged roasting (2 hours, at 120°C, c.f. Vasundhara, page 686, first paragraph), there probably was *no* 2-FFT.

686 VASUNDHARA/PARIHAR/VIJAYARAGHAVAN

Materials and methods

Isolation of volatile fractions from roasted and unroasted mustard seeds

5 kgs of cleaned brown mustard seeds obtained from the local market were hand pounded and passed through 30 mesh B.S.S. The powder was thinly spread in aluminium trays and transferred to an oven maintained at 120 °C wherein they were roasted for 2 h with intermittent shaking. The roasted powder after cooling

Furthermore, the detection of trace amounts of 2-FFT does <u>not</u> suggest that heating will "develop" or form 2-FFT in any significant concentration.

In fact, Vasundhara appears to demonstrate that heating Brassica juncea seeds at 120° even over prolonged periods of 2 hours will <u>not</u> form any commercially significant

amount of 2-FFT, as the authors have been searching for sulfur compounds and but have not mentioned 2-FFT (Vasundhara, page 685, last paragraph, in particular the last sentence):

> **Whereas the flavour of unroasted mustard powder has been reported to be due to isothiocyanates, the flavour of roasted mustard has not been studied. There is a distinct change in the flavour and taste of mustard as a result of heat treatment. During roasting the enzyme is destroyed. In the absence of the enzyme, allyl thioglucoside undergoes thermal cleavage to give allyl nitrile, glucose, sulphate and sulphur [2]. The present paper reports the identification and microestimation of nine carbonyls, six pyrazines, six sulfur compounds, two amines and one nitrile in roasted brown mustard seeds.**

The six sulfur compounds were identified by Vasundhara as allylthioglucoside, thiophene, 2-methyl thiophene, allyl iso thiocyanate, allyl iso thiocyanate, and 3-butenyl isothiocyanate (compare Vasundhara table 1, and page 1 last para).

It seems reasonable that the skilled person faced with the Vasundhara disclosure would conclude that either there was no 2-FFT for Vasundhara to find, or the concentration *even after prolonged heating* was so low as to be undetectable.

The examiner asserts that "nothing critical is seen in the specification as to using temperatures in the range of 120-250°C".

Notably, this is not the range claimed, as claims have been amended to "about 160°C to about 250°C", and are further amended to "at least about 10 minutes".

Heating to the claimed range, as can be seen in example 14 (compare relevant table below), is required to form commercially significant amounts of 2-FFT.

TABLE 5

Temperature (° C.)	Duration (Min.)	FFT Concentration (μg/kg)
160	5	<1
160	10	108
160	20	1706
200	5	514
200	10	3892
200	20	11453
240	5	3550
240	10	19507
240	20	3663

Notably, the Berchthold process of up to 120°C would not have "developed" or formed any commercially significant amount of 2-FFT, as the seeds are heated at up to 120°C for 15 minutes ("stabilised") while the seeds are exposed to even lower temperatures for the 10 minutes it takes to reach up to 120°C.

Vasundhara shows us that even if heating for two hours at 120°C (page 686, first paragraph), the amounts are so small that even if looking for sulfur compounds, 2-FFT is overlooked.

Notably, the currently claimed process will provide the 2-FFT containing flavour-enhancing ingredient more efficiently and in a shorter time, while the process described in Berchthold uses a different temperature, explicitly teaches away from using higher temperatures, does not disclose the flavour-modifying property and at best produces, without disclosing so, a very low amount of 2-FFT, and the latter only if Brassica seeds are selected from the range of seeds that are enumerated.

Accordingly, reconsideration of the propriety of the rejection of the foregoing claims under 35 USC 103(a) and its withdrawal is respectfully requested.

Regarding the rejection of claims 1-7, 12, 15-16, and 20-21 under 35 USC 103(a) in view of XP 0090148/Vasundhara et al. (hereinafter simply "Vasundhara"):
For the sake of brevity, reference is made to the remarks above which are herein incorporated by reference, as the prior remarks similarly apply to claims 1-7, 12, 15-16, and 20-21.

Shortly, Vasundhara discloses heat-treating B. juncea at 120°C for 2 hours, analyzing for sulfur compounds, and, *notably, not detecting 2-FFT.* The skilled person would have to conclude that no significant amount of 2-FFT is present.

The examiner states that "Claim 1 and the other pertinent claims have been amended to require a higher, lower temperature of 160°C." We would like to clarify and submit that 160°C is a significantly higher temperature compared to Vasundhara's 120°C, *especially in view of the significant amounts of 2-FFT formed at the higher temperature.*

In contrast to the Examiner's assertion that "... nothing critical is seen in the specification as to using temperatures in the range of 120-250°C", we would like to stress that the present claims claim temperatures of at least about 160 °C for 10 minutes, and point again to table 5 in example 14, demonstrating that the concentration of 2-FFT reaches a commercially significant amount when heated for at least about 10 minutes at 160°C. As Vasundhara seems to show, if the temperature is lowered to 120°C, then the time necessary to form a commercially significant amount of 2-FFT apparently increases drastically, at least to more than 2 hours, as no 2-FFT was detected by Vasundhara when specifically looking for new sulfur compounds that develop upon roasting.

The Examiner asserts that "Brassica seeds, contain the same 2-furfurylthiol which is developed on heating. Since the chemical compound of 2-furfurylthio (2 ff) would be the same no matter what type of seed was used, then *heating it to temperatures within the claimed amount would develop the 2ff*" (emphasis added).

We make reference to our previous comments on the issue of "developing" a compound. Chemical compounds do not in and of themselves "develop", multiply or otherwise necessary increase in their concentration simply by application of heat. In particular, 2-FFT is formed by reactions within seeds, reactions that in sesame are apparently specific to the botanical material they occur in, as disclosed by Schieberle. As discussed in more detail above, Vasundhara appears to show that 2-FFT does not form in commercially significant amounts upon heating (at least not when heating 2 hours at 120°C). Schieberle discusses the special situation for sesame, in particular the involvement of a different precursor in 2-FFT formation, which differs from other botanicals. Therefore the skilled person would *not* use the information to combine it with other seeds unless they were closely related to sesame - which Brassica seeds are not. These remarks similarly apply to dependent claims 2-7, 12, 15-16, and 20-21 which depend on and thus necessarily include the relevant features of claim 1.

Accordingly, reconsideration of the propriety of the rejection of the foregoing claims under 35 USC 103(a) and its withdrawal is respectfully requested.

Regarding the rejection of claims 9-11 and 16-19 under 35 USC 103(a) in view of the combined references of XP-002249876/Schieberle et al. or WO 03/041515 to Berchtold et al. or XP 00901488/Vasundhara et al. (hereinafter simply "Schieberle" or "Berchtold" or "Vasundhara") and US 3,697290 to Lynn et al. (hereinafter simply "Lynn"):

With regard to the instant rejection, for the sake of brevity, applicant refers to an herein incorporates by reference the prior remarks concerning the Berchtold, Schieberle and Vasundhara references as being similarly relevant to the present grounds of rejection.

Lynn is directed to a process employing *sesame* seeds, and accordingly does not add anything above Schieberle's disclosure, for the reasons discussed above as well as in our previous reply. Since 2-FFT is not disclosed, Lynn appears even less relevant than

Schieberle. Lynn merely discloses sesame seeds heated to a temperature range that from 300 to 350°C, whose number range happens to overlap with the claimed range. However, Schieberle already disclosed a process heating white sesame seeds to 180°C for 10 minutes.

Notably, Schieberle further discloses that the unique characteristics of sesame relevant to 2-FFT formation are not shared by other botanicals, compare comments on Schieberle herein-above. Brassica seeds and sesame seeds botanically are extremely remote. Accordingly, the skilled person would not have applied a sesame process to Brassica seeds in expectation of the process achieving its results.

None of the prior art references alone or in combination disclose Brassica seeds having a 2-FFT concentration as claimed.

In view of the foregoing remarks, reconsideration of the rejections raised by the Examiner is respectfully requested, and early issuance of a *Notice of Allowance* is solicited.

Should the Examiner in charge of this application believe that telephonic communication with the undersigned representative would meaningfully advance the prosecution of this application towards allowance, the Examiner is invited to contact the undersigned at their earliest convenience.

PETITION FOR A TWO-MONTH EXTENSION OF TIME

The applicants respectfully petition for a two-month extension of time in order to permit for the timely entry of this paper. The Commissioner is hereby authorized to charge the fee to Deposit Account No. 14-1263 with respect to this petition.

CONDITIONAL AUTHORIZATION FOR FEES

Should any further fee be required by the Commissioner in order to permit the timely

entry of this paper, the Commissioner is authorized to charge any such fee to Deposit Account No. 14-1263.

Respectfully Submitted;

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Enclosure – Request for Continued Examination

CERTIFICATE OF TELEFAX TRANSMISSION UNDER 37 CFR 1.8

I certify that this document, and any attachments thereto, addressed to the: "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" is being telefax transmitted to (571) 273-8300 at the United States Patent and Trademark Office.

Allyson Ross — Date: 10 February 2009